November 2021

ARMY COMMUNICATOR

Branching Signal

Plus:

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The Army Communicator is published as a command information e-publication for the men and women of the United States Army Signal Corps under the provisions of AR 360-1.

Submit articles, photos, graphics, videos, story ideas, and nominations for “Signal Spotlight” to the editor here. For additional information, please call (706) 791-7384.
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On the Cover

The Signal Regiment was on site for Branch Week at the US Military Academy in West Point, NY. Photo by Maj. Mike McConkey

Signal Regimental Team

COL James Turinetti IV
Signal School
Commandant

Both the Regiment and the Force continue to be decisively engaged. As many of you know, last month saw the launch of MOS Convergence Phase 1. This has resulted in the consolidation of 17 MOS's into 13, most recently in the 25C MOS becoming 25U. In this issue, we recognize the final 25C class as they prepare to assume the responsibilities of their new roles as Signal Operations Support Specialists. These are some exceptional Soldiers who are about to accomplish great things in the Signal Corps and our Army.

On a grander scope, the Army recently published the Unified Network Plan. According to the Office of the Army Deputy Chief of Staff, G-6, this "will integrate the Army's various network efforts to allow secure and seamless communications using our mission networks, our support to Joint All Domain Command and Control with sister services, and the Mission Partner Environment with our partners and allies." You'll read more about the Unified Network Plan in this issue, but the bottom line is that Soldiers will have immediate access to the information they need when they need it, safely and securely.

Finally, this month sees two major observances and it's fitting that they are only two weeks apart. As Thanksgiving approaches, we are often encouraged to focus on the things we are thankful for such as our friends, families, health, and safety. Before that, our nation recognizes Veteran's Day. This is our opportunity to reflect on those who have served in the US military, and thank them for their dedication and service to our nation.

Here at the Signal School, we are thankful for all of you and your contributions to the Signal Regiment and our Army. Pro Patria Vigilans!

CSM Darien Lawshea
Regimental CSM

CW5 Chris Westbrook
Regimental CWO

Army releases Unified Network Plan

US Army Public Affairs

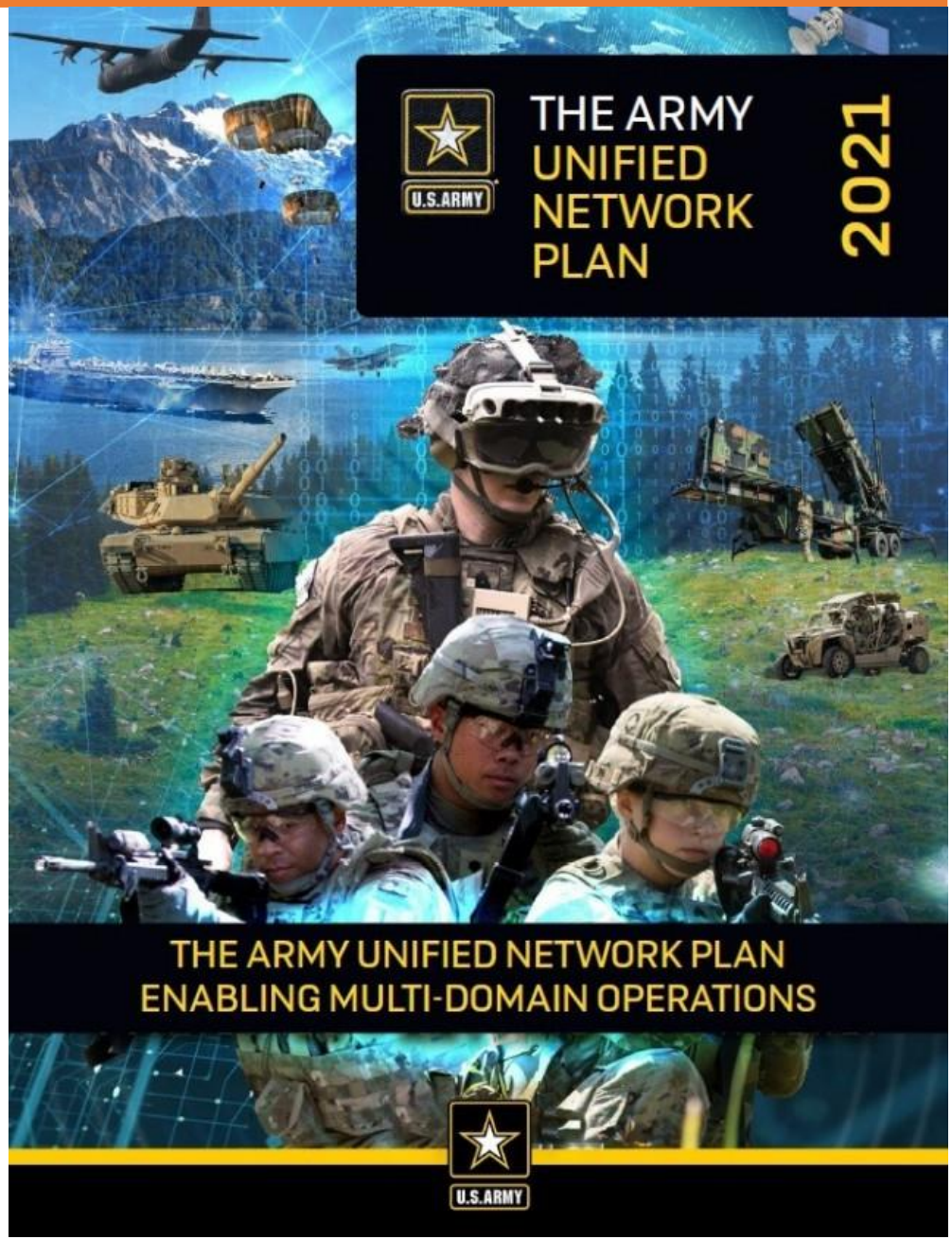
The US Army announced the release of its Army Unified Network Plan, which will help the Army to establish a Multi-Domain Operations capable force by 2028.

The Unified Network will enable Army formations, as part of the Joint Force, to operate in highly contested and congested operational environments with the speed and global range to achieve decision dominance and maintain overmatch. The plan shapes, synchronizes, integrates and governs Unified Network efforts and aligns the personnel, organizational structure and capabilities required to enable MDO at all echelons.

“Our potential adversaries’ threats continue to increase in number, degree of complexity and level of physical and technical damage they can inflict,” said Lt. Gen. John Morrison Jr., Deputy Chief of Staff of G-6. “The Unified Network gives the Army the ability to operate in a highly contested and congested operational environment with speed and at a global range that enables the decision dominance commanders need to maintain overmatch.”

The Unified Network will integrate the Army’s various network efforts to allow secure and seamless communications using mission networks, support to Joint All Domain Command and Control with sister services, and the mission partner environment with our partners and allies.

To read the Army Unified Network Plan, click here https://www.army.mil/article/250992



Dragon Cloud first enduring tactical cloud presence for conventional Army

CW3 Brian McDonell
101st Air Assault Division

In late 2020, XVIII Airborne Corps chose to become the Army's first-ever Artificial Intelligence enabled Corps. These requirements have culminated into a drive for innovation, which Col. Dan Kearney, the Program Director for Project Ridgway of the XVIII ABC has defined as the process of solving today's problems with today's technologies.

Upon identifying this goal, the corps leadership immediately set about identifying leadership capable of the size and scope of this effort. In February of 2021, Cpt. Jonathon Schumaker a 26A, and CW3 Brian McDonell a 255A were plucked from their traditional duties with the 101st Air Assault Division G6 and empowered to establish the first enduring tactical cloud presence for the conventional Army. This effort was to be incorporated with efforts from fellow divisions, such as 82nd Airborne Division's edge computing effort, to provide a total solution that can be refined and eventually fielded to the conventional Army as a whole.

The 101st Div began working diligently with their mission partners like the Enterprise Cloud Management Agency, Amazon Web Services, the Army Analytics Group, and Cloud Army to develop a plan to establish a tactical cloud environment. The first iteration of the cloud for the Army would be in Impact Level 5 as unclassified dedicated space to provide a proof of concept of cloud viability. This initial cloud offering would show an extended cloud computing capability as well as highlight any operational benefits that come with it. By the end of March, the 101st Div had a fully operational Command Post Computing Environment suite that was accessible from any Army networked unclassified computer on the

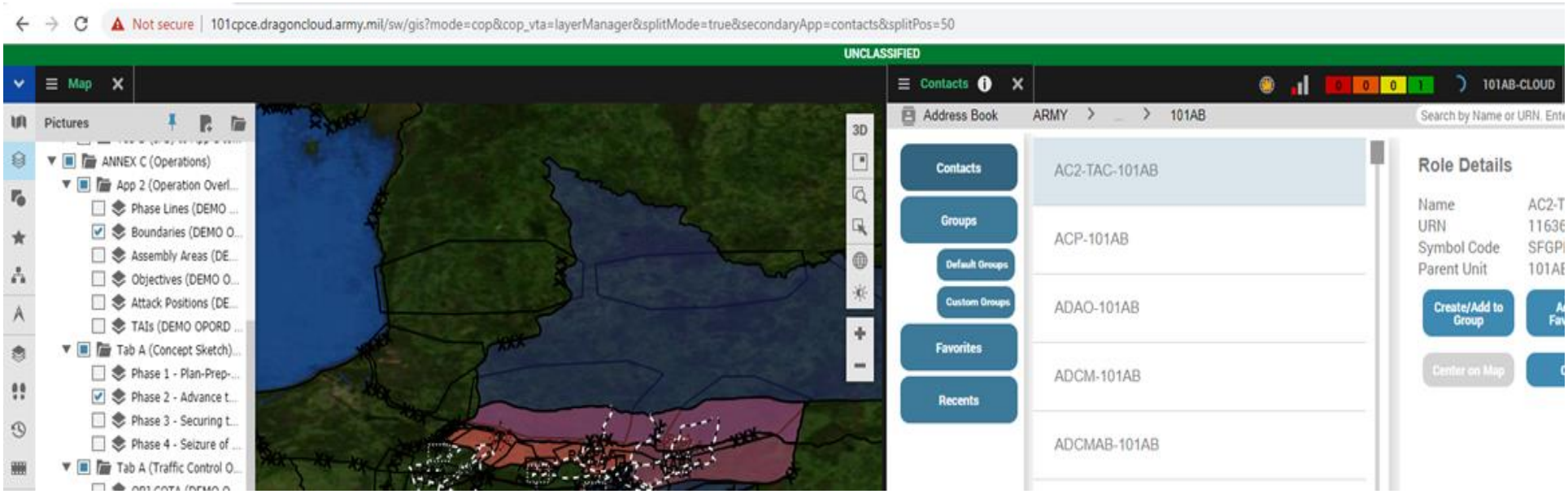
Courtesy graphic

globe through what was to be called the Dragon Cloud from the XVIII ABC.

The proof of concept came in the form of learning how to get currently fielded Army Program of Record software like CPCE to function properly in Dragon Cloud as these applications are not yet fielded as being "cloud-native". All Army applications are developed on Windows Server 2012R2 which is several versions behind currently available server software to commercial industry. Dragon Cloud utilizes Windows Server 2019 which provides a better cybersecurity posture over that of Windows Server 2012R2 because, as being a more current version, it addresses and mitigates a much larger range of vulnerabilities not addressed by 2012R2. Additional software such as Tactical Radio Application eXtension, WAVE, and Microsoft Exchange were also deployed in Dragon Cloud to further demonstrate software interoperability in the cloud.

News of the Dragon Cloud's achievements has made it to the desk of the Secretary of the Army and was briefed to the Chief of Staff of the Army, Gen. James McConville, and the Sergeant Major of the Army, Sgt. Maj. Michael Grinston in early September. This positive recognition at the Army level has contributed to the continued support for the efforts of XVIII ABC from senior leaders. The initial results of Dragon Cloud have helped establish the buy-in necessary to pursue a real-world, operational classified cloud environment that will process live data within an IL6 environment once again through ECMA and AWS. This iteration of the classified cloud will provide a viable solution to carrying the network on our backs by eliminating the requirement of deploying large physical server stacks at the tactical edge and instead utilizing cloud computing to access Army resources from anywhere.

In the name of innovation, the 101st Div is planning to implement even more traditional PoR software in Dragon Cloud such as targeting and



Graphic by CW3 Brian McDonnell

fires applications, intelligence gathering, and analysis tools while utilizing AWS native features for optimization and improved performance. The 101st Div continues to partner with many Army Program Management offices that have vested interest in the successful implementation of their software applications in-to Dragon Cloud. This united effort brings with it the greatest chance for success and true innovation for Army communications.

The Dragon Cloud IL6 environment will be taking advantage of commercial innovations and embedded AWS-managed features to improve the state of the network in terms of reliability, flexibility, and agility. AWS cloud features also allow for reduced administrative workload for Army network administrators such as the ability to deploy server infrastructure in minutes versus days. Additionally, the inherent and guaranteed reliability of cloud resources provides increased availability and performance for the end-user. Automatic scaling of resources allows for a degree of flexibility that has never been available in Army information systems. Army mission command systems will be able to scale depending on workload to deliver unprecedented levels of application agility.

Dragon Cloud IL6 will also be designed to be available worldwide just as with the IL5 unclassified environment. This means that Commanders will see a 60 percent reduction in hardware requirements when deploying forces away from home station which also improves agility and flexibility at the edge as well as dramatic logistics savings during movements. Dragon Cloud's ability to host live strategic data in the cloud allows for users to operate in disjointed environments at the tactical edge effectively over a persistent data fabric. These innovations allow for a more consistent, reliable, and available network at fractions of the cost.

The implications that stem from the Dragon Cloud will hopefully pave the way for future innovations and improvements of Army systems. The network of tomorrow that Commanders will use to fight and win future fights must be extremely agile, flexible, reliable, and most importantly sustainable. The innovation of Dragon Cloud is a large leap in the right direction to meet the needs of tomorrow's Army.

Courtesy graphic

Signal participates in West Point Branch Week

Maj. Mike McConkey
Career Program Manager

Signal Officers and Enlisted Soldiers from 50th ESB-E, 1-89 CAV, 3rd Special Forces Group-Airborne, and the Signal Proponent spent a week with future Army Officers at the United States Military Academy's annual Branch Week. The United States Military Academy's Branch Week, held September 6-10, 2021, is a display of the Army's basic and special branches. It is designed to give the Corps of Cadets a chance to learn more about their future careers in the Army and allows them to make a more informed decision when it's time for them to choose their branch. It was a phenomenal event that highlighted the Army's branches and the weapon systems that makes us the most lethal military in the world.

Each branch had the opportunity to show West Point cadets their latest and greatest equipment and capabilities. The Signal branch static display at Branch Week demonstrated some of the cutting edge tactical equipment currently being fielded to units at the tactical edge. The 50th ESB-E displayed their expeditious digital network transport capabilities. The cadets were able to see and interact with the modern capabilities in the Signal branch that are supporting the Unified Network and enabling Command Post Mobility and Survivability. The 50th ESB-E Soldiers deployed a Small Scalable Node (SNN) Command and Control package and a high-capacity Terrestrial Transmission Line of Sight (TRILOS). The cadets also saw the latest in Combat Net Radio (CNR) capabilities from the Soldiers of 1-89 CAV. The Soldier's display highlighted the PM NetWarrior based equipment found in a BCT-based TOE and the AN/PRC-163. The AN/PRC-163 was recently fielded as part of the Integrated Tactical Network (ITN) CNR capabilities and provides the warfighter with a software defined, handheld, multi-channel radio.

More important than the display of equipment were the Signal Officers and Enlisted Soldiers interacting with the West Point cadets. Cadets were able to hear first-

The Signal Regiment was on site for Branch Week at the US Military Academy in West Point, NY.
Photo by Maj. Mike McConkey

Cadets were able to learn about the opportunities available in the Signal Regiment during Branch Week at the US Military Academy in West Point, NY.
Photo by Maj. Mike McConkey

hand what life is like in the Signal Corps. Many of the cadets have little knowledge of the branches prior to Branch Week. Their conversations with the Signal Soldiers provided invaluable insight that will help them make their branching decisions in the coming weeks. First Lt. Isabella Minter from 50th ESB-E was one of the outstanding Signal Soldiers that participated in Branch Week. As a recent graduate from USMA, she was able to relate to the current students and provide first-hand accounts of being a Platoon Leader and Company Executive Officer in the Signal Corps. Her interactions, along with the other Signal Soldiers, helped inform the cadet population of the significant impact Signaleers have on the warfighter.

Cadets were also able to interact with the Signal Regiment's leadership during formal class engagements. Junior and senior cadets with a high level of interest in the branch attended a branch brief with Col. James Turinetti IV, the US Army Signal School Commandant, and Command Sgt. Maj. Darien Lawshea, the Regimental Command Sergeant Major. The cadets were given an overview of the branch and an opportunity to ask questions to the regimental leadership and branch representatives.

West Point cadets participate in a talent-based branching process. Cadets preference each branch based on their level of interest. Branch Week, along with other branch engagements, are an important part of branching process for cadets. It gives them an opportunity to learn more about the duties and responsibilities of officers in each branch and determine if it's a good fit for them. Branches also have a vote in the process. Branches interview cadets and review their performance during their time at West Point. Branches select their most preferred cadets based on the Knowledge, Skills, and Behaviors the branches require. The branching process aligns cadets with the right talents to the right branch.

The Signal Proponent is already preparing for Branch Week 2022. The Signal Corps will build on the success of the 2021 Branch Week and provide an even better experience for the West Point cadets. The goal is to better inform cadets, demonstrate the latest Signal capabilities, and attract the best talent to the branch.

Gordon hosts Innovation Day

Nicholas Spinelli
Office Chief of Signal

After more than a year and a half away, Fort Gordon welcomed back the National Conference Services, Inc. (NCSI) Innovation Day.

The event, which was hosted by the US Army Signal School, saw 26 industry partners set up displays at the Gordon Conference and Catering Center. Installation leadership, Soldiers and civilians were all invited to tour the presentations and get up close looks at the latest in communication technology and innovations.

"The response has been pretty positive. Both government and industry are excited to have this program back," said Erin Phelp, a representative for NCSI.

Innovation Day is typically held twice a year on Fort Gordon – once in the spring and once in the fall. However, due to the COVID-19 pandemic, this was the first live event held on post since March of 2020.

"We were able to start doing live events again earlier this year,"Phelp said. "Before that, they were virtual."

According to Phelp, some of the features of the virtual events were incorporated into the in-person activities, with the company asking itself what were some of the practices developed during COVID they could keep.

"It's exciting because we're implementing new ideas, such as offering online company profiles and virtual presentations alongside the onsite exhibitors," she said. "It allows for representation from companies that aren't currently able to travel."

And while the virtual aspects of Innovation Day provide greater industry representation, it's the face-to-face interaction that's the biggest draw for many.

"The importance of events like this being held in person cannot be understated," Col. James Turinetti IV, The US Army Signal School Commandant and Chief of Signal, said. "Hands-on demonstrations with new equipment and face to face interactions are crucial elements of the defense and industry partnership."

Fort Gordon Leadership received a tour of exhibitions during Fort Gordons Innovation Day. Photo by Nick Spinelli

Life on the Red Team

Maj. Ryan Chanko
1st IO Command

My name is Maj. Ryan Chanko, and I commit cybersecurity felonies—legally. Red Teaming is the methodology of using stealth and tradecraft to aggress a network environment using physical, wireless, and network attack vectors to accomplish prearranged objectives. Leading a Red Team I have developed a skillset in offensive security that allows me to lead a team of Service Members, Army Civilians, and Contractors that emulates real world adversary behavior.

I have been a member of the DoD Red Team community at 704th MI Brigade and 1st IO Command (Land). Both units have billets for 26B Officers. I am grateful to have held positions of Team Leader and Deputy Chief within the Red Team community. As a Team Lead, I was responsible for building, maintaining, and leading Service Members, Army Civilians and Contractors in Red Team techniques, tactics, and tradecraft. My role as Red Team Deputy Chief of the Army's only Red Team is unmistakably unique. Our organization's lessons learned influence NETCOM, ARCYBER, and USCYBERCOM policies

Maj. Ryan Chanko

As a member of the certified Department of Defense Red Team Community, I directly impact the overall mission to secure the DoDIN. I help shape DoDIN policy through Red Teaming engagements, missions, and exercises. I shape planning that helps identity relevant cyber threats, scope training objectives to measures performance, and recommend considerations for risk mitigation. My subject matter expertise informs senior leaders and network owners by informing them to appropriate threat representative objectives. These objectives outlined in the Rules of Engagement help defenders hone their skills against suspicious external and internal network activity.

During the engagement, I lead an opposing cyber force in multi-domain operations against the target audience. I rely on my training, creativity, and grit to overcome challenging technical problems to accomplish mission objectives. The findings in the final report provide critical network remediation recommendations for decision makers at all levels from Division to Geographic Combatant Command and our elected officials in congress.

Red Teaming has allowed me to develop a skillset in offensive security and learn the tradecraft of advanced persistent threats. I worked around the world with all branches of the military service, leading universities, influential cybersecurity companies, multi-national partners and allies. I recommend Red Teaming for cyber professionals that are autodidactic learners, love being creative, and aren't deterred by challenging problems.

Final 25C Class graduates

Nick Spinelli
Office Chief of Signal

History was made last month when the final 25C, Radio Operator-Maintainer, Class graduated from Advanced Individual Training. Upon arrival at their next assignments, the Soldiers of Bravo Company 369th Signal Battalion will be classified as 25U, Signal Operations Support Specialists.

The transition is part of Phase 1 of MOS Convergence, which went into effect October 1.This strategy, developed by the US Army Signal School, will resolve operational challenges by redesigning the MOS structure based on functions and levels of communications support, rather than on tasks associated with equipment sets. Phase I reduces the CMF 25 Enlisted structure from 17 MOSs to 13 MOSs.

During the ceremony, Staff Sgt. Joshua Burnham, drill sergeant, congratulated the graduates, assuring them that their training more than made them ready for their new roles.

"You may not think you have the training, but you do," he said. You will all go on to do great things."

For the graduates and the speakers, the ceremony was about so much more than just the completion of training. It was about legacy.

"Today we [25C] are going away, but we will not be forgotten," Burnham said.

His sentiments echoed those of Staff Sgt. Jimmy Roberson, class instructor, who also spoke at the ceremony.

"The 25C MOS will leave a lasting impact on history," he said. "It has been a privilege."

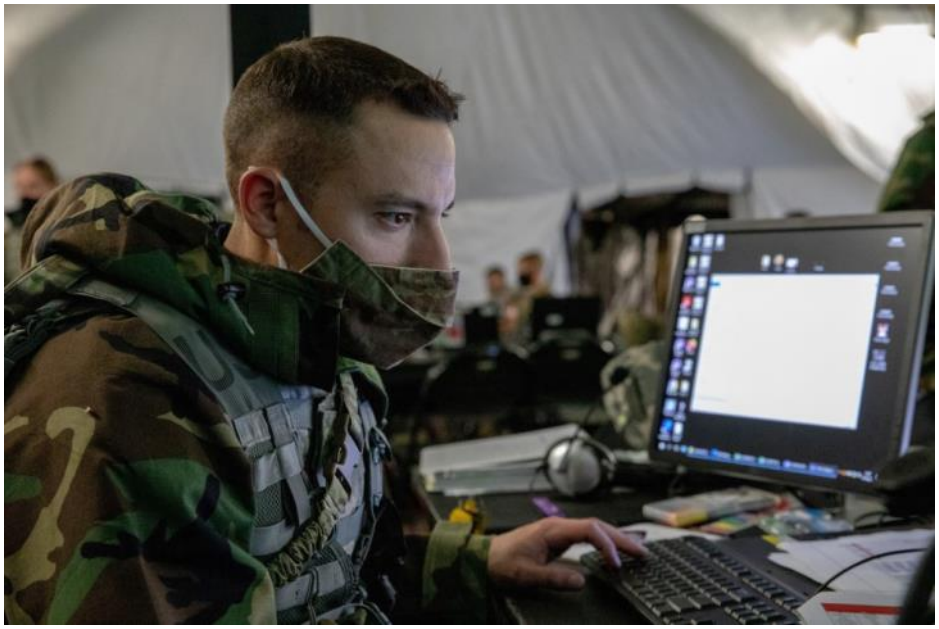
The Soldiers of Bravo Company 369th Signal Battalion made up the last class of 25C Radio Operator-Maintainer.
Photo by Nick Spinelli

Army uses containerized software to improve network resiliency

Jasmyne Douglas
DEVCOM C5ISR Center Public Affairs

Army engineers are using containerized software to strengthen the Army's networks.

Engineers of the Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance and Reconnaissance (C5ISR) Center — a component of Army Futures Command's Combat Capabilities Development Command — are developing application security containers to protect the Army's networks from hardware and software failures.



Sgt. Travis Tasler, a battle noncommissioned officer with the 347th Human Resources Company of the Minnesota National Guard, monitors a computer during an exercise. In addition to making systems more resilient to hardware and software failures, application security containers will deny malicious actors from gaining access to the computer networks through backdoor channels.
Photo by Sgt. Brandon Whittemore

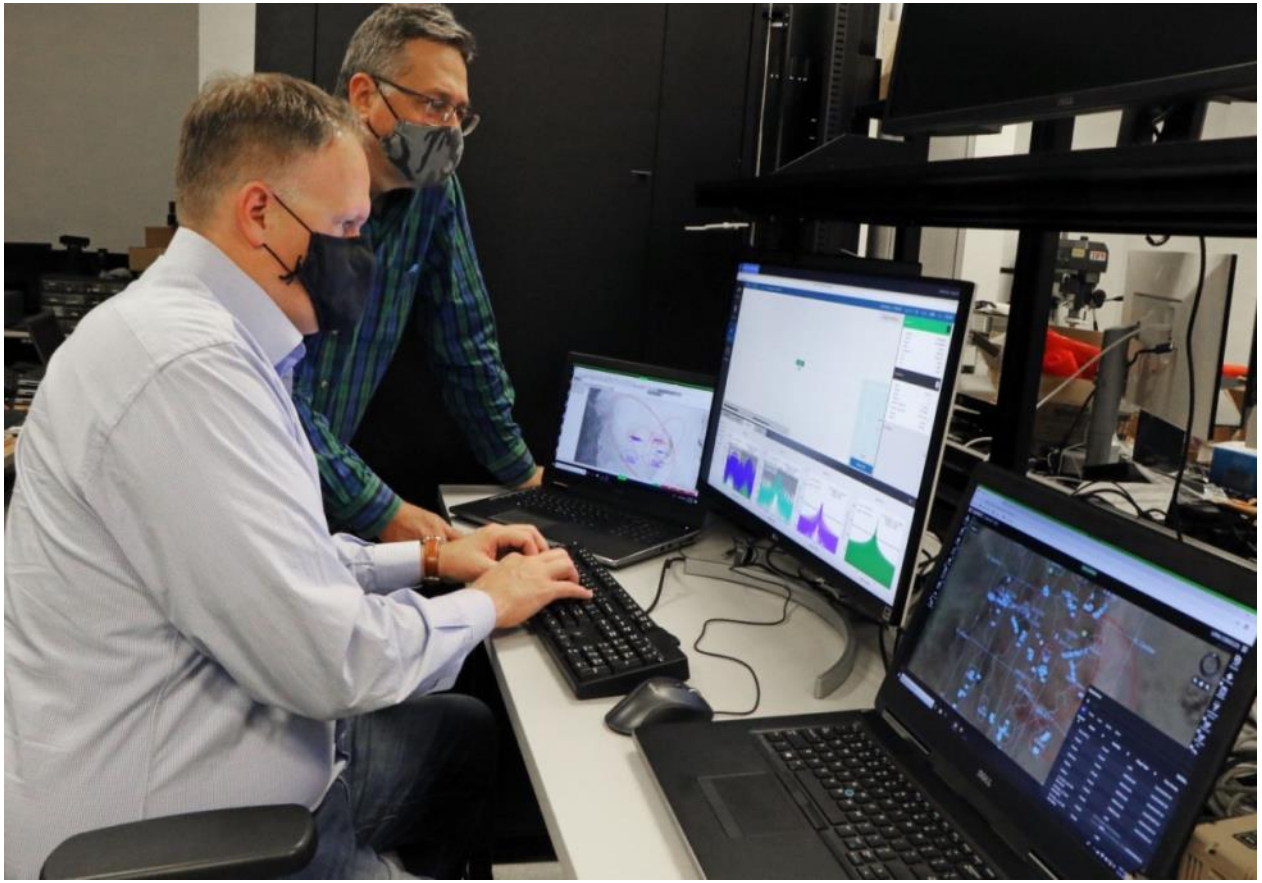
"Application security containers are one of the fundamental building blocks to modern cloud computing infrastructure, and are one of the foundational elements to start building applications in the future," said Frank Geck, one of the C5ISR Center engineers leading the effort.

In addition to making systems more resilient to hardware and software failures, Geck said application security containers will deny malicious actors from gaining access to the computer networks through backdoor channels as well as simplify the system troubleshooting process between engineers and system operators.

Humza Shahid, a C5ISR Center engineer working the effort, compared the containers to virtual machines – a virtual computer within a computer. Shahid said the modularity of the containers removes unnecessary software and applications from the system and only stores "the key information that's different from a normal computer," reducing the size, weight and power required to run the system.

"So instead of having these massive, several gigabyte files, it may come down to a couple hundred megabytes," Shahid said.

Application security containers are one of several promising new security technologies. The modular qualities of the containers also help to reduce the "attack sur-



C5ISR Center engineers conduct routine software testing. Application security containers are one of the fundamental building blocks to modern cloud computing infrastructure as well as one of the foundational elements to building future applications.
Daniel Lafontaine

face" of the technology it is housed in, closing off the avenues adversaries can take to infiltrate the system.

"We demonstrated a migrated and containerized application server at NetModX 21," Geck said, in reference to the centerpiece of the Army's campaign of learning, designed to aggressively advance and integrate the Army's contributions to the Joint Force. "The setting of NetModX allows us to test the functionality of the containerized applications in a relevant and realistic environment."

Geck said engineers were also able to record logs during the experiment which will later be used to compare how the capability operates in the NetModX mission-relevant environment to how it would operate in the Tactical Systems Integration System (TSIF) testing center at Aberdeen Proving Ground as well as their own testbed.

This is the first year the Army has aligned Advanced Component Development and Prototyping funding as a logical follow-on to key science and technology efforts in the Network CFT portfolio, allowing them to have a better sense of the timeline and process for conducting market research, and reviewing and awarding contracts. Michael Monteleone, the Center's executive director of Engineering and Systems Integration, said the alignment of Advanced Component Development and Prototyping funding with the Center's science and technology efforts increases "the chances of technologies transitioning into the program offices."

"Being able to use this funding allows us, as a science and technology community, to continue to make sure that what we're doing is focused on plugging the gaps within our capabilities," Monteleone said. "In bridging those gaps, we can ensure that when we hand the technology off to a program of record, the resources are there to finalize the last mile to get the capability out into the field."

SIGNAL HISTORY

Bombs at Bikini

Signal Corps Participation in Operation Crossroads

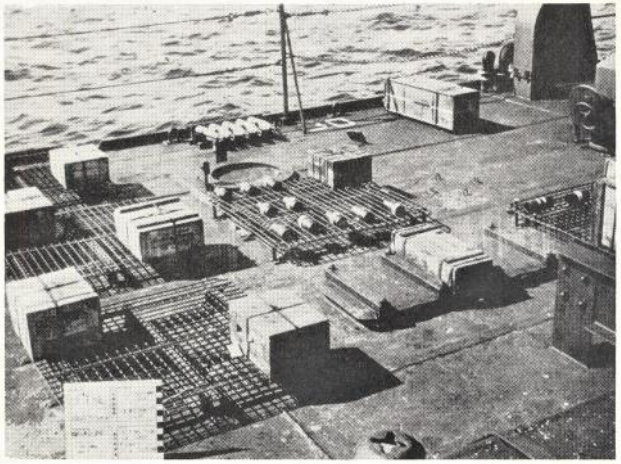
Steven J. Rauch
Signal Corps Branch Historian

Say or read the word “bikini” and an image is evoked in one’s mind. However, what is that image of? Is it the small pieces of cloth that make up a style of women’s beach wear? Is it the home of Sponge Bob Squarepants under the sea? Or is it a vision of a tremendously large atomic mushroom cloud roiling and suspended over a remote Pacific atoll? Whichever it may be all are related, however one of those images clearly occurred before the others. During July 1946, Army-Navy Joint Task Force One (JTF-1) conducted tests using atomic weapons to observe if military equipment could survive and still operate in the new domain of atomic war. The test was named *Operation Crossroads* and included both an atomic airburst over, and a sea burst below, the Bikini Atoll lagoon. US Army participation included representatives from the Signal Corps, Corps of Engineers, Ordnance Corps, Chemical Corps, Quartermaster Corps, and Army Air Forces. During the tests, the Signal Corps was tasked with two missions. First, to provide communications capability for joint communications to the task force, and second, to provide representative communications equipment for exposure to the force, heat, and radiation of atomic bombs.

In January 1946, the Joint Chiefs of Staff sought to study the effects of nuclear weapons on military equipment of all services. *Operation Crossroads* was commanded by Vice Adm. William H.P. Blandy and conducted at Bikini Atoll, an elliptical chain of 26 small islands linked by coral reefs that formed a lagoon about 20 miles long and 10 miles wide. Bikini was part of the Marshall Islands about 2,100 miles southwest of Hawaii and 250 miles north of Kwajalein. The test fleet comprised over 90 vessels anchored within the lagoon. Among the targets were four battleships, two aircraft carriers, two cruisers, 11 destroyers, eight submarines, three captured ships, and numerous other vessels making it at the time the sixth largest fleet in the world. The ships were loaded with fuel and ammunition along with live test animals including pigs, goats, rats, and mice. Adm. Blandy stated, “Not only warfare but civilization itself literally stands at the Crossroads…..hence the name of this operation.”

The plan initially called for three tests, but due to the

BAKER test of 23 kiloton atomic bomb on July 25, 1946 at Bikini Atoll. Signal Corps Historical Collection.



Above: Signal equipment aboard ship prepared for atomic testing. Below: Former German cruiser Prinz Eugen with US Army SCR-584 radar set trailer mounted on the ships' forecastle for navigation and testing. Signal Corps Historical Collection.

limited production of atomic bombs only two were conducted - Tests ABLE and BAKER. For ABLE a B-29, nicknamed "Dave's Dream," was to drop a 23 kiloton bomb designed to explode at 155 meters above the target center like those that had been dropped on Japan earlier. Test BAKER however was unique since it was the first time a bomb was to be detonated under water at a depth of 90 feet. As expected, there was much preparation and coordination among the US military, civilian scientists, and other agencies. In March 1946, the US prepared Bikini Atoll for the exercise and removed 167 residents – the entire native population – to Rongerik Atoll about 125 miles away.

Another reason for *Crossroads* was to show the world the destructive power of these new weapons in real time. *Crossroads* was well-publicized and included visitors from all areas of the US government, including members of Congress, as well as representatives from the newly formed United Nations. These explosions would be well documented in film, photographs and reports by over 175 media personnel from all over the world.

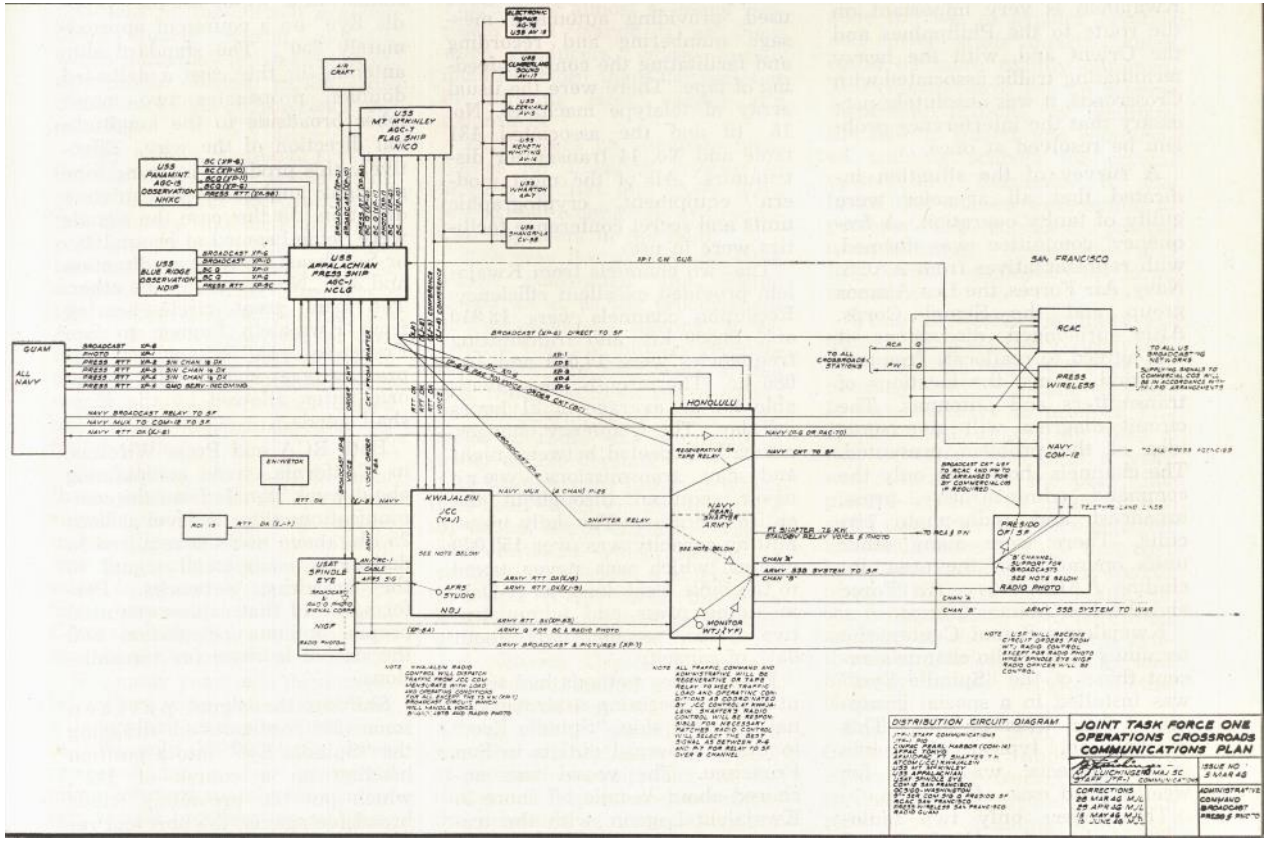
JTF-1 consisted of about 250 ships, 42,000 military personnel and 150 aircraft. This included army ground and air forces along with naval forces. The main mission was to record scientific data so there were over 750 cameras, 5,000 pressure gauges, and 25,000 radiation detectors at the test. The army element was designated Task Group 1.4 and led by Col. J.D. Frederick, an infantry officer. The mission was to provide examples of all types of army equipment from tanks, trucks, personnel carriers, artillery, and supplies such as food, rations, and ammunition to be stored on the ship decks for testing and analysis.

The Signal Corps element designated Task Group 1.4.2., consisted of civilian and military personnel with scientific and engineering expertise from the Signal Corps Engineering Laboratories (SCEL) at Fort Monmouth, NJ. These men could assess the effects of the blasts on the functionality of any communications equipment that survived. Equipment operators were tasked from signal units in the operational forces to conduct their normal MOS functions. The total number of Signal personnel in TG 1.4.2 was 52 men including eight officers, 16 civilian engineers and technicians, and eight enlisted soldiers from SCEL. An additional 20 soldiers were provided from units to operate the equipment.

The members of TG 1.4.2 were responsible for seven target installations and eight instrumentation projects. The choice of signal equipment to be included for the test was determined by commonality to the army as well as unique items. Initially 30 items

were suggested for testing but eventually the list was narrowed to 18 items. The equipment was installed as close to operational configuration as possible on the decks of the target ships which were anchored at various distances from the center of the detonations. Wire equipment included field telephone EE8s and Carrier Relay CF-3. Radio equipment included SCR-536 handie-talkies, radio set SCR-694 and the mobile SCR-399. The SCR-584 anti-aircraft gun-laying set and the SCR-682 harbor surveillance radar represented radar equipment.

Installing Army signal equipment on naval vessels was not new, but challenging because of the variety of ships, including former enemy ships, required unique fabrication of fixtures for deck mounting. The most significant example was the installation of an SCR-584 radar set on the forecastle of the German cruiser *Prinz Eugen.* This helped the mixed German and American crew navigate the ship from Philadelphia during the long sea journey to Bikini atoll and be part of both the air and sea detonations of atomic bombs. One unsettling aspect of the test was that after the radiation dissipated to safe levels, the men returned to the ships to attempt to operate or repair equipment as might happen in a real world situation.



JTF-1 Operation Crossroads Communications Network Diagram. Signal Corps Historical Collection.

Once equipment was selected and installed, a means to measure, test, and analyze the pressure, temperature, radiation, and other physical phenomena had to be devised. In this case, the engineers had to develop unique test instruments to record data for analysis. For the instrumentation and testing team, the airburst bomb proved to be closest to operational conditions in terms of blast, pressure and heat. The explosion of an undersea bomb would not provide any representation of army field experience. However, both experiments provided exposure of very complex components to extreme shock and heat that could not be matched in laboratory settings.

In addition to the testing aspect of Operation Crossroads, the Signal Corps provided communications capability to the various teams, both on

ships and on Bikini Island itself. In February 1946, the Army Communications Service (ACS) was tasked to provide command and administrative communications along with press, broadcast and radiophoto services to JTF-1. This mission was centered on Kwajalein Island and included 25 officers and 78 enlisted men. The Army communications ship, “Spindle Eye” was transferred from Tokyo Bay to handle the public information broadcasts and relay information back to the US public. One of the major communications challenges for the ACS was allocation of frequencies. Some of this was solved by reallocating frequencies and changing the locations of transmitters and antennas.

Finally, the Signal Corps was represented by non-participating observers there to view the atomic tests as part of a more doctrinal and operational understanding for future warfare. These included Chief Signal Officer, Brig. Gen. Spencer Akin, Dr. Harold A. Zahl, Col. E.C. Gillette and Col. T.T. Teague who sailed on the *USS Blue Ridge* command ship.

Joint Communications Center established at Kwajalein for Operation Crossroads. Signal Corps Historical Collection.

On July 1, 1946, test ABLE took place. Participants viewed the blast of the world’s fourth atomic explosion using special goggles about 17 miles away. Once the initial flash subsided, the goggles were removed and the after affects were observed with the naked eye. During ABLE five of the target ships were sunk immediately. About three hours after the explosion, the testing craft and command ships moved into the lagoon with Geiger counters to measure radiation. A brief tour of the target area was made via ship, but no target ships were boarded until the next day. After the radiation levels were determined safe, inspectors and operators returned to the vessels to assess what equipment, if any, remained in operable condition.

On July 25, the BAKER test occurred and proved to be the most spectacular in effect than anyone had imagined. The underwater explosion was described by the Director of Research at SCEL, Dr. Zahl as, *“the waters of the lagoon arose like a giant*

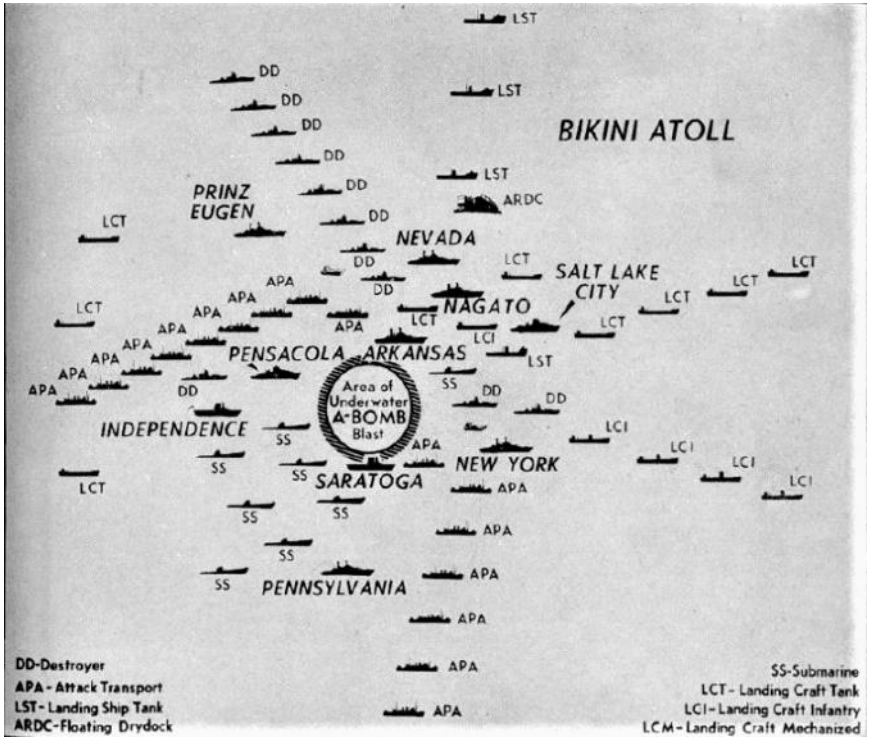


Diagram showing BAKER underwater atomic bomb and target vessels.
Signal Corps Historical Collection.

asparagus tip. The central column of water expanded until it covered more than 2,200 feet at the base. The top of the water spread out in mushroom fashion and for a short time appeared to hang suspended in air. Then the millions of tons of water began falling like a great white curtain and engulfed the target vessels. The entire target array became enshrouded in the white, highly radioactive and dangerous fog. When the mist lifted, some of the ships were missing and others were listing. Everyone who viewed this spectacle was forcefully aware that he had just witnessed the grandest, but yet the most horrible thing ever conceived by man." During BAKER, nine ships had sunk during the explosion or immediately after.

It was apparent at the conclusion of the tests that most military equipment could not survive atomic explosions, though heavy items such as tanks and artillery were relatively unaffected. Lighter equipment was destroyed by the heat and blast within 2,500 yards of the explosion. Items that were shielded by large metal areas of ships were less damaged or likely to be destroyed. Col. L. E. Seeman, Corps of Engineers wrote a letter to Maj. Gen. Leslie Groves, commander of the Manhattan Project, stating the experiment was, "A gross waste of effort, but probably very useful in indoctrinating personnel on the effects of atomic explosives." Another officer stated, "The Army equipment displayed on the deck of the *Arkansas* was for the most part a complete wreck. Some items of equipment in sheltered spots on the main deck had been relatively well protected." On the *Nevada*, the same situation greeted observers who said, "The Army equipment and the Navy airplanes displayed on the stern of this ship were a shambles." The Navy however, seemed to ignore the fact that the decks had buckled, bulkheads were shattered and nothing of use remained on the decks of the ships. The main concern of most naval officers was that most of the ships were still afloat and that was interpreted as a naval fleet was still relevant in this new era of warfare. For the army contingent, other than a trove of data, little use could be made of any equipment due to outright destruction, lingering radioactivity, or being sunk to the bottom of the lagoon.

About to the other images mentioned at the beginning of this article. During the events of *Operation Crossroads*, Paris swimwear designer Louis Reard decided to promote his latest swimsuit design in the midst of worldwide attention on the Bikini Atoll. Thus, he called his new clothing creation "Bikini" and that name, much like the radiation levels at Bikini atoll, is still with us today.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